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SUBSTITUTE PTO/SB/16 (5-03)

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR §1.53(c).

INVENTOR(S)

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Additional inventors are being named on the 0 separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)

Elastic Nonwoven/Film/Nonwoven Laminate

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ENCLOSED APPLICATION PARTS *(check all that apply)*

[X] Specification *Number of Pages* 6

[] CD(s), Number

[X] Drawing(s) *Number of Sheets* 2

[X] Other (specify) Provisional Application Cover Sheet

[] Application Data Sheet. See 37 CFR 1.76.

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

[] Applicant Claims small entity status. See 37 CFR 1.27.

[X] A check or money order is enclosed to cover the filing fees.

[X] The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 06-1050

[] Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($) $160.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No.

[] Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

Signature _____ Date December 18, 2003

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PROVISIONAL APPLICATION FOR PATENT

under

37 CFR §1.53(c)

TITLE: ELASTIC NONWOVEN/FILM/NONWOVEN LAMINATE

APPLICANT: Matthew J. O'Sickey
Constance S. Donnelly
James W. Cree

CERTIFICATE OF MAILING BY EXPRESS MAIL

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Elastic Nonwoven/Film/Nonwoven Laminate

TECHNICAL FIELD

This invention relates to garments, and more particularly to disposable garments and tri-laminates for making such garments.

BACKGROUND

Disposable garments are well known in the art. Most are outer garments which may have elastic cuffs. A fitted garment, such as undergarments or socks, would need to be made of mostly elastic material, as opposed to simply the cuffs. Elastic material is typically not soft or breathable and is therefore not comfortable for use as a disposable garment. Elastic materials that may be breathable and soft are typically too expensive for use in a disposable garment.

SUMMARY

A disposable undergarment is comprised of an outer shell made of an elastic laminate that is breathable, soft and affordable to produce. The laminate is comprised of an elastomeric film core with nonwoven fibers bonded to either side of the elastomeric film. The elastomeric film has apertures that allow the laminate to be breathable.

The laminate is made by introducing a first nonwoven material over a vacuum forming screen. The elastomeric thermoplastic material which forms the film is then introduced from an extrusion die, such as a slot die or blown die, onto the first nonwoven while a vacuum is pulled from the opposite side of the screen. The vacuum pulls the elastomeric thermoplastic film into the nonwoven bonding the two together and creating irregular apertures in the elastomeric film formed by the elastomeric thermoplastic material as it cools. A second nonwoven is applied on the exposed surface of the elastomeric film either while the film material is still hot enough to thermally bond to the second nonwoven, or after the elastomeric film has cooled the second nonwoven may be bonded with an adhesive or other bonding method. Once the three layers are bonded the material is run through an incremental stretching process, such as ring rolling or intermeshing gears. The incremental stretching may be performed in the machine direction (MD), tentering direction (TD) (also known as the cross direction (CD)), or both directions. Diagonal stretching patterns may also be desirable in certain applications.

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. 1 is a schematic depiction of various garments.

FIG 2 is a schematic of one process for manufacturing an elastomeric laminate.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

A disposable garment 10 that is fitted to the body surface is comprised of an elastic laminate. The garment 10 may be for any portion of the body and for any use where a disposable fitted garment 10 is desired. Some examples shown in FIG 1 are underwear brief or panty 12, sock 14, undershirt 16, brassiere 18, and long underwear 20. In the case of brief or panty 12 an absorptive insert of natural or synthetic materials may be added in the crotch section. Likewise, sock 14 may include additional padding if needed. Other design modifications from the basic designs shown are possible to fit the intended use. Other examples of garment 10 may be head bands for holding hair out of the users face, a disposable fitted hat for use under helmets and other hats, and disposable mitten or glove liners.

Garment 10 is made primarily of elastic laminate 22 which is a breathable, soft elastic laminate. The construction of laminate 22 is discussed in detail below, but it is understood that laminate 22 may be sewn or bonded in other ways to form garment 10. Also, depending on the materials used to form laminate 22, decorative or instructive printing may be added to provide an improved appearance or instructions for use of the garment 10.

Elastic laminate 22 comprises three layers: a first nonwoven layer 24, an elastic film layer 28, and a second nonwoven layer 32. The elastic laminate 22 is formed by introducing the first nonwoven layer 24 to a screen 26. The first nonwoven layer 24 is positioned on screen 26 while elastic film material 28 is extruded from die 30 onto the first nonwoven layer 24. The screen 26 is well known for making vacuum formed films and has a pattern of openings, or apertures.

Examples of screen 26 would include a screen with 20 apertures per linear inch in a square pattern, known as 20 square, and a screen with 8.75 apertures per linear inch in a hexagonal pattern, known as 8.75 hex. Other similar screens are suitable as well.

While the elastic film material 28 is still somewhat molten from the extrusion process a vacuum is pulled on the opposite side of the screen 26 so that the soft elastic film material 28 is drawn into the first nonwoven 24 and apertures 38 are formed in the elastic film material at the point of apertures in the screen 26. Because the first nonwoven 24 somewhat obscures the apertures in the screen 26, the apertures 38 in the elastic film material 28 are not as well formed as typical vacuum formed films using similar screens 26.

A second nonwoven 32 is introduced opposite the first nonwoven 24 and bonded to the elastic film material 28. The second nonwoven 32 may be introduced while the elastic film material 28 is still malleable and thereby thermo bonded to the elastic film material 28. Alternatively, the second nonwoven 32 may be bonded to the elastic film material through an adhesive bond. Additionally, the second nonwoven 32 may be bonded to the elastic film material 28 through other bonding methods such as thermal bonding, sonic bonding, or other means known in the art. Once the second nonwoven 32 is bonded to the elastic film material 28, which is already bonded to first nonwoven 24, a non-elastic laminate 34 is formed. Laminate 34 is not elastic, despite elastic laminate film material 28, because the fibers of nonwovens 24 and 32 are not elastic and prevent excessive stretching of the laminate 34.

Laminate 34 is then fed into an incremental stretching means 36. Incremental stretching means 36 may be a ring roller or intermeshing gears. Both operate similarly to stretch the material along discrete lines, but not over the entirety of the material. This forms areas that are stretched bordered by areas which are not stretched. Also, incremental stretching will break the fibers of the nonwoven in areas where it is stretched to create a softer material. The stretching may be done parallel with the length of the material, known as the machine direction (MD), or may be done across the length of the material, known as the tentering direction (TD) or cross direction (CD). Additionally, the incremental stretching may be done in both directions, diagonal directions, or a combination of the above. When laminate 34 has passed through the incremental stretching means 36 it will be elastic laminate 22. Elastic laminate 22 will be elastic in the direction it was incrementally stretched, but less elastic in other directions, unless it was incrementally stretched in multiple directions. Therefore, if elasticity in a single direction is

desired, laminate 34 should be incrementally stretched in only that direction to form elastic laminate 22.

Any elastic thermoplastic material suitable for use near human skin may be used to create elastic film material 28. Examples would be krayton or metalocene catalyzed polyolefins. A wide range of nonwoven materials have been found to be suitable for use in laminate 22. In one example, having a 1.8 mil thick elastic core, a 15 gsm (grams per square meter) spun bond polypropylene nonwoven web sold by BBA Nonwovens as BBA 699D is used as first nonwoven 24 and a 25 gsm carded polypropylene nonwoven web sold by BBA Nonwovens as BBA 333D is used as second nonwoven 32. This provided a laminate 22 which was softer on one side and slightly tougher on the opposite side. Such a laminate 22 would be ideal for undergarment 10 as the soft side may be positioned adjacent the wearer's skin and the less soft side may be facing outer garments. When differing nonwoven materials are used as first nonwoven 24 and second nonwoven 32 the thinner material should be used as first nonwoven 24 to insure the best function of screen 26.

Elastic and elastomeric are relative terms relating to the ability of a material to elongate and recover much of its former shape. This is tested by elongating a material a certain amount and then measuring the change in the length of the material after it is relaxed. The amount the material is stretched is noted as a percentage of the length of the material being tested and the amount the length of the material has changed after relaxation is noted as percentage of the original length and is called permanent set. Therefore, for the purposes of this application a material is elastic or elastomeric if the material may be elongated by 100% and not have a permanent set of more than 10%.

A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, first nonwoven 24 may be adhesively bonded to a preformed apertured elastic film material. Accordingly, other embodiments are within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method for forming a laminate comprising:
introducing a first nonwoven layer to a vacuum forming screen;
extruding a thermoplastic elastomeric film material onto the first nonwoven layer opposite the screen;
applying a vacuum on the screen opposite the first nonwoven layer to pull the thermoplastic elastomeric material against the first nonwoven bonding the nonwoven to the elastomeric material and creating irregular apertures in the elastomeric material;
bonding a second nonwoven layer to the elastomeric material opposite the first nonwoven layer to form a three layer laminate; and
incrementally stretching the laminate to form an elastomeric laminate.
2. An undergarment comprised primarily of the laminate formed by claim 1.
3. An elastic laminate comprised of:
an elastomeric film material with apertures;
a first nonwoven layer bonded to the elastomeric film material; and
a second nonwoven layer bonded to the elastomeric film material opposite the first nonwoven layer, fibers extending outwardly from both the first nonwoven layer and the second nonwoven layer.
4. An undergarment comprised primarily of the laminate of claim 3.

ABSTRACT

A disposable undergarment is comprised of an outer shell made of an elastic laminate that is breathable, soft and affordable to produce. The laminate is comprised of an elastomeric film core with nonwoven fibers bonded to either side of the elastomeric film. The elastomeric film has apertures that allow the laminate to be breathable.

The laminate is made by introducing a first nonwoven material over a vacuum forming screen. The elastomeric thermoplastic material which forms the film is then introduced from an extrusion die, such as a slot die or blown die, onto the first nonwoven while a vacuum is pulled from the opposite side of the screen. The vacuum pulls the elastomeric thermoplastic film into the nonwoven bonding the two together and creating irregular apertures in the elastomeric film formed by the elastomeric thermoplastic material as it cools. A second nonwoven is applied on the exposed surface of the elastomeric film either while the film material is still hot enough to thermally bond to the second nonwoven, or after the elastomeric film has cooled the second nonwoven may be bonded with an adhesive or other bonding method. Once the three layers are bonded the material is run through an incremental stretching process, such as ring rolling or intermeshing gears. The incremental stretching may be performed in the machine direction (MD), tentering direction (TD) (also known as the cross direction (CD)), or both directions. Diagonal stretching patterns may also be desirable in certain applications.

Fig. 1

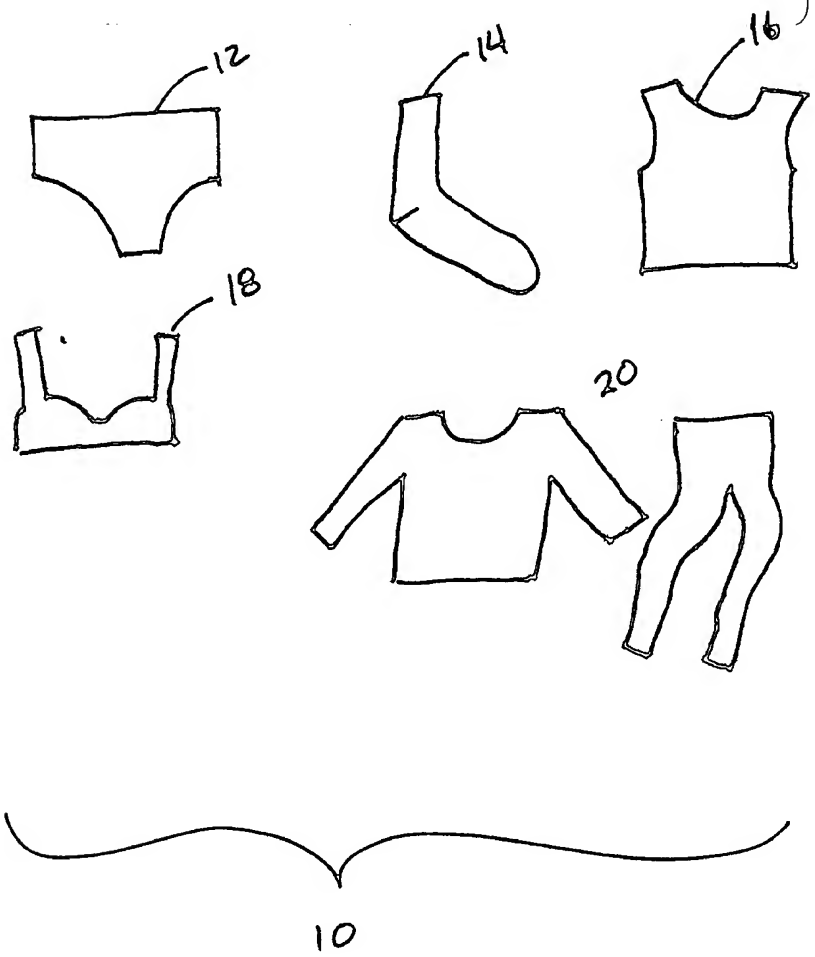

Fig. 2